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EXAMINER	
DEPPE, BETSY LEE	
ART UNIT	**PAPER NUMBER**
2634	4

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Please find below and/or attached an Office communication concerning this application or proceeding.

pp 4

Office Action Summary	Application No. 09/813,795	Applicant(s) SAMARASOORIYA, VAJIRA N. S.	
	Examiner Betsy L. Deppe	Art Unit 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-17 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-6, 8-14 and 16 is/are rejected.

7)☒ Claim(s) 7,15 and 17 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 22 March 2001 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are objected to because the some of the elements in Figures 1, 2, 4, and 5 should be labeled so that one viewing the drawings may understand the subject matter of the claimed invention without referring to the detailed description. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following:

on page 7, line 17, "of the" should be inserted before "phase accumulator"; and

the detailed description does not describe the operation of the circuits shown in Figures 6 and 7.

Appropriate correction is required.

Claim Objections

4. The claims are objected to because of the following informalities:

in claim 1, line 4, "sampling" should be "a symbol rate" and "from a symbol rate" should be deleted;

in claim 1, line 6, "condition at" to "condition ***using signals with***" in order to be consistent with the detailed description;

in claim 1, line 8, "extrapolating" should be "generating" and "of said phase accumulator" should be inserted after "determined outputs" for clarification;

in claim 1, "at the generated addresses" should be inserted after "offsets" on line 10 and "at the generated addresses" on line 11 should be deleted for clarification;

in claim 1, line 9; claim 9, line 14, and claim 17, lines 2-3, the Examiner suggests changing "symbol rate look-up table" to "look-up table" for clarification. According to the detailed description, the table is providing frequency and phase offset information at a particular symbol rate. It does not include symbol rate information per se as suggested by the phrase "***symbol rate*** look-up table" (emphasis added).

in claim 6, line 1, "extrapolating" should be "generating";

in claim 8, line 2, the Examiner suggests inserting "further" before "includes";

in claim 9, the applicant should clarify that the limitations recited on lines 8-14 are part of the "feedback loop" recited on line 5 by numbering the limitations or further indenting the respective limitations;

in claim 9, line 6, "sampling" should be "a symbol rate" and "from a symbol rate" should be deleted;

in claim 9, line 8, "phase errors at" should be "phase errors ***of signals with***" in order to be consistent with the detailed description;

in claim 9, line 12, "extrapolating" should be "generating";

in claim 15, "accumualotor" is misspelled; and

in claim 16, line 1, "claim 14" should be "claim ***15***" since claim 15 recites the means for combining.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 4, 8, 12, and 16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

7. With regard to claims 4 and 12, it is unclear how the down-sampling factor is determined based on a data channel condition. It is unclear from page 6, lines 18 how data channel conditions affect pipeline delays and the selection of a down-sampling factor. For example, how does the down-sampling factor change as the data channel conditions change?

8. With regard to claims 8 and 16, it is unclear how the combined outputs are reformatted. It is unclear from Figure 7 and the detailed description how the combined signal is formatted.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in Figure 1 of the application in view of Wang (US Patent No. 6,356,598 B1).

11. With regard to claims 1 and 9, the admitted prior art in Figure 1 of the application discloses the claimed invention except for detecting the phase error of down-sampled signals (i.e. reducing by a down-sampling factor the rate of the input signals to a phase error detector) and generating extrapolated outputs to generate addresses to symbol rate look-up table.

Figure 3 of Wang teaches down-sampling the rate of signals prior to phase error detection and then generating interpolated/extrapolated outputs to provide addresses to a look-up table. (See column 4, lines 8-50) It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the down-sampling and interpolating/extrapolating steps/means in the circuit shown in Figure 1 of

the application in order to save processing and hardware. (See Wang, column 4, lines 51-58)

12. With regard to claims 2 and 10, the admitted prior art in Figure 1 of the application in view of Wang discloses the claimed invention including determining a down-sampling factor based on a predetermined maximum allowable pipeline delay. Since the disclosure indicates that the hardware of a conventional carrier recovery system results in pipeline delays (see page 5, lines 22-24) and Wang teaches that using the down sampling circuits save hardware, it is inherent that the down-sampling factor in the admitted prior art in Figure 1 of the application in view of Wang affects the pipeline delay. It would have been obvious to one of ordinary skill in the art at the time the invention was made to determine a down-sampling factor such that a predetermined maximum allowable pipeline delay is not exceeded in order to meet the requisite system requirements.

13. With regard to claims 3 and 11, the admitted prior art in Figure 1 of the application in view of Wang discloses the claimed invention including determining the down-sampling factor based on symbol rate. (See Wang, Figure 3 and column 4, lines 53-58)

14. With regard to claims 5 and 13, the admitted prior art in Figure 1 of the application in view of Wang discloses the claimed invention including an air interface processor for programming the rate of the carrier loop. (See page 1, lines 29-30) Since the air interface processor programs the rate of the carrier loop and the down-sampling factor affects the processing rate of the carrier loop, it would have been obvious to one

of ordinary skill in the art at the time the invention was made to have the air interface processor also program the down-sampling factor in order to centralize the control of the carrier loop.

15. Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in Figure 1 of the application in view of Wang as applied to claims 1 and 9, respectively, above, and further in view of Dickey et al. (US Patent No. 6.032.028). The admitted prior art in Figure 1 of the application in view of Wang discloses the claimed invention except for generating extrapolated outputs by determining the gradient of the outputs of the phase accumulator.

Since Dickey et al. teaches using a slope/gradient to interpolate/extrapolate a signal (see column 12, lines 38 - 66), it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a slope/gradient to generate the interpolated/extrapolated outputs in order to accurately compensate for the phase and frequency offsets.

Allowable Subject Matter

16. Claims 7, 15 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bolla et al. (US Patent No. 5,412,693) discloses an automatic frequency control loop wherein decimation occurs before a loop filter and interpolation occurs after the loop filter. (See Figure 2)

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Betsy L. Deppe whose telephone number is (703) 305-4960. The examiner can normally be reached on Monday, Tuesday and Thursday (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (703) 305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BDeppe

Betsy L. Deppe
Primary Examiner
Art Unit 2634